

A stylized red line graphic that forms a large, abstract shape. It starts with a horizontal line at the bottom left, goes up to form a vertical line, then curves into a large semi-circle on the left. From the top of the semi-circle, a horizontal line extends to the right, then a diagonal line goes up and to the right, ending in a small triangle. The text "1992 Annual Report" is positioned near the top of the vertical line.

**1992
Annual Report**

**Arkansas Science &
Technology Authority**

Mission Statement

The Arkansas Science & Technology Authority serves as a statewide funding resource for high quality scientific and technological projects. The Authority endeavors to bring the benefits of science and advanced technology to the people and state of Arkansas through scientific research, technology development, business innovation, and education.

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Chairman's Letter

June 30, 1992

Governor Bill Clinton
Members of the 78th General Assembly
State Capitol
Little Rock, Arkansas

Dear Governor Clinton and Legislators:

The board of directors and staff of the Arkansas Science & Technology Authority are proud to submit to you our 1992 Annual Report, which recounts the highlights of the Authority's programs and projects during the past year. This year's unpretentious annual report reflects our concern for good fiscal management, which was heightened by unforeseen fiscal constraints.

The Authority, through its core programs, continues to leverage the state's resources, provide avenues for the state's researchers and small businesses to become nationally competitive, and bring the benefits of science and technology to the citizens of Arkansas.

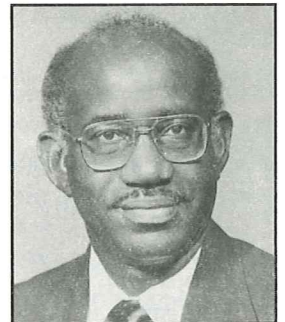
With your guidance and support, the Authority has become nationally recognized for its innovative policies and programs and serves as a model for other states. Our goal for the coming years is to continue entrepreneurial efforts to fill the science and technology needs of our citizens.

We thank you for your support and look forward to working with you to provide Arkansas with the science and technology policies and programs needed for the next century.

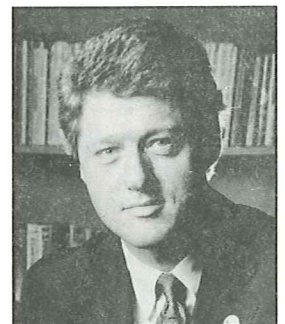
Sincerely,



William Willingham, Ph.D.
Chairman of the Board
Arkansas Science & Technology Authority



Dr. William Willingham
Chairman of the Board



Governor Bill Clinton

Committees

Science Advisory Committee

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Chairman

John L. McClellan Memorial Veterans
Administration Medical Center

John W. Ahlen, Ph.D.

Arkansas Science & Technology Authority

Carl Cerniglia, Ph.D.

National Center for Toxicological Research

R.D. Engleken, Ph.D.

Dept. of Engineering

Arkansas State University

Tom Goodwin, Ph.D.

Dept. of Chemistry

Hendrix College

Beverly Dawkins Lyn-Cook, Ph.D.

Division of Comparative Toxicology

National Center for Toxicological Research

Malay K. Mazumder, Ph.D.

Dept. of Electronics and Instrumentation

University of Arkansas at Little Rock

Frank T. Orthoefer, Ph.D.

Riceland Foods, Inc.

Phillip Rayford, Ph.D.

Dept. of Physiology and Biophysics

University of Arkansas for Medical Sciences

C. Dayton Steelman, Ph.D.

Dept. of Entomology

University of Arkansas, Fayetteville

Bob Watson, Ph.D.

Dept. of Biology

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Joe Gentry, Ph.D., P.E.

Arkansas Science & Technology Authority

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University of Arkansas at Pine Bluff

Ms. Cathy Field

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University of Arkansas, Fayetteville

Tom Goodwin, Ph.D.

Hendrix College

Joe Nix, Ph.D.

Ouachita Baptist University

Gaylord Northrop, Ph.D.

University of Arkansas at Little Rock

Tim O'Brien, Ph.D.

University of Arkansas for Medical Sciences

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Arkansas State University

John Spraggins, Ph.D.

Arkansas Department of Higher Education

Karl David Straub, M.D., Ph.D., *Chairman*

John L. McClellan Memorial Hospital

John Troutt

Jonesboro Sun

Joyce Sadler

Arkansas EPSCoR

President's Report

The Arkansas Science & Technology Authority (ASTA) was created by the legislature in 1983 to bring the benefits of science and advanced technology to the people and the state of Arkansas. Fiscal year 1992 marks ASTA's eighth year of existence and the sixth year of operating research and development programs.

Basic and Applied Research.

Arkansas scientists and engineers perform cutting-edge research. This has been demonstrated in ASTA's Basic and Applied Research Programs. Consequently, it has been shown that small investments in early-stage research by ASTA lead to larger follow-on grants from federal agencies.

Basic research leads to applied research in the research and development pipeline. Moreover, applied research clearly flows back to basic research, as applied research successes generate interest in even more advanced possibilities requiring additional basic research.

Keeping abreast of advances in basic and applied research requires continued investments in the infrastructure of research and development. The infrastructure includes modern equipment and

laboratory space. In addition, there is a need for people who want to acquire the education and training needed to practice science and engineering. ASTA has helped to enable universities to increase their scale of research and development by providing matching funds for major centers under the Centers for Applied Technology Program.

Development. As ASTA's capstone program, the Seed Capital Investment Program has made investments in new and expanding scientific and technological businesses. These businesses have directly contributed to job creation in Arkansas.

Development programs providing the technology transfer needs of small- and medium-sized businesses had not been adequately addressed in Arkansas before ASTA's Technology Transfer Program. The groundwork for the potential expansion of the Technology Transfer Program was laid by the Technology Extension Pilot and Planning Projects, funded in partnership with the National Institute of Standards and Technology (NIST).

Special Projects. At the request of Governor Clinton, ASTA has



*Dr. John Ahlen
President, ASTA*

become involved in efforts to improve science, mathematics, and engineering education. One example of ASTA's involvement is its Arkansas Ventures in Education Project. The Ventures program emphasizes achievement in mathematics and science through curriculum enhancement, faculty development, and career guidance in rural Arkansas school districts.

Another request from the Governor led ASTA to conduct a study for establishing a residential math and science high school in the state. The study was the basis for authorizing and funding bills for this educational institution. This project is supported with the participation of ASTA's president on the advisory board of the Arkansas School for Mathematics and Science.

ASTA's programs have demonstrated important economic development principles and, in doing so, have taught the staff valuable lessons while operating the programs. Furthermore, ASTA's participation in research and development through the operation of these programs has given Arkansas a national reputation for quality and innovation in economic development.

ASTA maintains the following *Core programs*:

Research

Basic Research
Applied Research
R&D Tax Credits

Development

Seed Capital Investments
Technology Transfer
Technology Development
SBIR Awareness

And also includes these *Infrastructure-building programs*:

Centers for Applied Technology Business Incubators

Response to and success of these programs has been exceptional. Since its inception in July 1985, the Basic and Applied Research Grants Programs have received 397 proposals and have funded 113.

Under its EPSCoR Program, Arkansas has been awarded the first year of a possible five-year grant from the DOE for 20 traineeships supporting graduate education in energy-related projects. ASTA administers matching funds provided by the state.

The Basic and Applied Research Grants Programs competitively fund original investigations for the discovery and application of scientific and engineering knowledge. Most projects have a direct, long-term effect on the economic vitality of the state of Arkansas. These projects provide opportunities for other technology development and business innovation programs.

The Basic Research Grants Program. This uses state funds as an incentive to get scientists active in new areas of research and provide them with the beginning of a research track record, which helps them become nationally competitive, bringing more research funds to the state. Table 1 shows basic research grants awarded in FY1992.

The Applied Research Grants Program. This uses state matching funds as an incentive: (1) to get scientists active in lines of applied research and provide them with the beginning of a track record, which helps them become nationally competitive, bringing more research funds to the state; (2) to encourage partnerships with industry and provide industry with new technology that secures and expands employment; and (3) to build the capacity to rapidly commercialize research results. Table 2 shows applied research grants awarded in FY1992. (There is a Research and Development Tax Credit for the match.)

DOE/ASTA Traineeship Grants. Governor Bill Clinton provided the Arkansas Science &

Technology Authority (ASTA) with \$250,000 from stripper well funds to match a United States Department of Energy (DOE) grant for an energy-related traineeship program. The traineeships are designed to enhance the energy-related resources and infrastructure in the state.

Grant recipients are selected on the basis of quality. Review and selection of participants are performed by the Experimental Program to Stimulate Competitive Research (EPSCoR) Committee in compliance with on-going review procedures at ASTA.

The EPSCoR Committee in conjunction with ASTA awarded 20 graduate student traineeships. The traineeships consist of a \$21,000 stipend, \$3,000 in tuition and fees, and \$1,000 in travel and publications. The participating graduate students are in energy-related science and engineering fields of study, thus keeping the pipeline of scientists and engineers flowing. Table 3, on page 8, is a list of recipients of these awards.

The Research & Development (R&D) Tax Credit Program. This uses a state R&D tax credit as an incentive for business enterprises to seek new technology through partnerships with university research; to secure and expand employment; and to build the capacity to rapidly commercialize research results. R&D tax credits in the amount of \$6,932 were awarded in FY1992. Since 1985, ASTA has approved \$42,756 in tax credits.

Table 1
Basic Research Grants Fiscal Year 1992

Project	Investigators/University	ASTA Grant
Genetic Transformation of Spinach/ Agrobacterium Tumefaciens	Dr. Feng H. Huang UAF	\$37,490
Molecular Characterization of Colletotrichum Orbiculare	Dr. James C. Correll UAF	43,000
Construction of Selective Sensors in Molecular Monolayers	Dr. Neil Allison/Dr. David Paul UAF	43,643
Rust Transformer Development	Dr. Seifollah Nasrazadani UAF	27,712
Biochemical Reactions of Oxygen	Dr. Robert C. Steinmeier UALR	35,700
Gas Phase Association Reactions	Dr. William S. Taylor UCA	18,897
Tissue Response to Pulsed Yellow Light Laser Irradiation	Dr. Stephen Flock UAMS	34,652
Vitamin C in Insects	Dr. Gary W. Felton UAF	30,280
Disturbance Reduction Via Fussy Logic Control	Dr. Terry W. Martin UAF	33,869
Reducing Large Training Sets for Neural Networks	Dr. Susan Mengel UAF	30,997
Metabolism of Off-Flavored Chemicals in Catfish	Daniel Schlenk UAMS	22,080
Synthesis and Uses of Photoactive Anti-viral Nucleoside Drug	Dr. Richard R. Drake UAMS	29,172
Studies of Larval Serum Protein Expression for Mosquito Control	Dr. Helen Benes UAF	37,315
Administration and Outreach Program for Arkansas NSF/EPSCoR	Dr. Karl David Straub VA Hospital	90,362
Total		\$515,169

Table 2

Applied Research Grants Fiscal Year 1992

Project	Investigators/University	Industry Co-sponsor	Co-sponsor Match	ASTA Grant
Defatted Rice Bran Feeding Value for Cattle	Dr. Arthur L. Goetsch UAF	Riceland Foods	\$8,500	\$8,500
Development of Improved Process Technology for the Manufacturer of Carboxylic Acid Chlorides	Dr. John R.I. Eubanks Arkansas	Arkansas Eastman Kodak	21,007	21,007
Effects of Active Immunization in Gilts	Dr. David Kreider UAF	Ark. Pork Producers Ass.	6,500	6,500
Understanding and Improving the Efficiency of Foliar Feeding Cotton	Dr. Derrick M. Oosterhuis UAF	Alzheimer Association	17,500	17,500
Forage Production and Soil Nutrient Status as Affected by Swine Lagoon	Dr. J. Mike Phillips UAF	Ark. Pork Producers Ass. Tyson Foods, Inc. Cargill, Inc.	2,000 11,000 11,000	20,400
Utilization of Rice Bran Proteins in Foods	Dr. Patti Landers/Dr. Roy Sharp UAF	Rice Research and Promotion Board	12,500	12,500
Total			\$90,007	\$86,407

Traineeship Grant Table

Table 3
 DOE/ASTA Traineeship Grants Fiscal Year 1992

Project	Professor/University	Grantee
Scientific Models for Multi-Metal Catalyst Systems	Mark Draganjac ASU	Tanya Hagler
Effect of Drying Air Conditions on Drying Rate of Rice and Resultant Kernal Quality	T.J. Siebenmorgen UAF	Cheryl Schulman
Structure/Function Relationships in Proteins involved in Photosynthesis	D.J. Davis UAF	Marti Scharlau
Flourinated Hydrogenated Amorphous Silicon Nitrogen Alloy for High Efficiency Solar Cells	H.A. Naseem UAF	Steven Kizzar
Intra-Cavity Laser Raman Spectroscopy on Distillates of Hydrocarbon	M.K. Hudson UALR	Kathy Underhill
Design Studies for Investigating Coherent Pions	W.J. Braithwaite UALR	Charles Byrd
Flourinated Hydrogenated Amorphous Silicon Ceranium Alloy for High Efficiency Solar Cells	W.D. Brown UAF	Warren K. Harper
Structural Studies of Molecular Conductors	A.W. Cordes UAF	Clinton Bryan
Materials Compatibility in Superconducting Multi-Chip Modules	R.K. Ulrich UAF	James Dee Palmer
Development of an Improved Gas/Steam Turbine Seal	Mark C. Johnson UAF	Christopher C. Kopp
Optical Characterization of High Temperature Superconductor Films	Greg Salamo UAF	Steven E. Elkins
Instrumenting the STAR Detector for Relativistic Heavy Ion Collider	Andre Rollefson UALR	G. Douglas Mauldin
High Temperature Flue Gas Cleaning with Ceramic Granular Filters	M.K. Mazumber UALR	Chien Wang
Production of Methane from Cellulosic Materials by Anaerobic Fermentation	James Moore UAF	Matthew W. Taylor
Cost Effective Process to extract Ethanol from Fermentation Broth using Light Alkylate as Solvent	Jim Turpin UAF	Sam Heintz
Harmonic Impact of Photovoltaic Inverter Systems used for Bulk Power Generation	Kraig Olejniczak UAF	David G. Daniels
Optical Characterization of Diamond Films for Superconductor Multi-Chip Modules	Min Xiao UAF	Diane Bootz
Flourinated Hydrogenated Amorphous Germanium Carbon Alloy for High Efficiency Solar Cells	Simon Ang UAF	Paul Moffitt
Heat Transfer Characteristics of Solar Siding	Rick Couvillion UAF	Melinda Palmer
Advancement of Electrostatic Separation Process for Dry Cleaning Coal	M. K. Mazumber UALR	Gina Jones

Research Centers

The Centers for Applied Technology Program. This was established in 1989 to encourage collaborations between institutions of higher learning and private and public enterprises. In FY1991 and FY1992, the Centers Program provided matching funds in the amounts of \$560,000 and \$600,000, respectively, for an award from the National Science Foundation's (NSF) Experimental Program to Stimulate Competitive Research (EPSCoR) to establish the following three centers: (1) the Center for Protein Dynamics at the University of Arkansas, Fayetteville (2) the Arkansas Neurobiology Research Center and (3) the Center for Cellular and Molecular Studies on Biological Aging, both at the University of Arkansas for Medical Sciences.

The Center for Protein Dynamics at the University of Arkansas at Fayetteville directed by Dr. Roger E. Koeppe, had 24 Ph.D. students being supported by EPSCoR funds in 1991. In addition, 13 undergraduate students and three visiting faculty worked at the center this summer.

The Center for Neurobiology Research at the University of Arkansas for Medical Sciences directed by Dr. Edgar Garcia-Rill, had 10 undergraduate students this summer (four of whom were minorities); four (minority) high school students; and one high school teacher. They had a series of four training seminars given by the Principal Investigators.

The Center for Cellular and Molecular Studies on Biological Aging at the University of

Arkansas for Medical Sciences, directed by Dr. Samuel Goldstein, had a total of nine undergraduate students working in its laboratories for the summer. Weekly seminars were held with the investigators presenting an overview of their research and the students presenting individual research reports at the completion of the summer.

In FY1992, the Centers Program provided matching funds for (1) an award from the NSF to establish the Center for Material Handling at the University of Arkansas, Fayetteville (\$180,000) and (2) an award from the National Aeronautics and Space Administration (NASA) to establish the Arkansas Space Grant Consortium (ASGC) (\$75,000).

The Center for Material Handling at the University of Arkansas, Fayetteville, directed by Dr. Eric Malstrom, is a cooperative effort between the NSF, four major universities, and a group of industrial affiliates. The Center presently has six industrial affiliates, including AT&T, Little Rock; Manville Corporation, Riverwood International Subsidiary; Pine Bluff Arsenal; Red River Army Depot; U.S. Postal Service; and Whirlpool Corporation, Ft. Smith.

The Arkansas Space Grant Consortium (ASGC) is a training grant to educate and familiarize faculty and students with aerospace fundamentals and NASA's research programs. The program encourages students to go into aerospace work at NASA or other aerospace industries when they graduate and to train faculty members to become researchers

The Centers for Applied Technology encourages collaborations between institutions of higher learning and private and public enterprises to speed the discovery, development, and application of new technologies.

Under the Arkansas EPSCoR Program, 107 graduate and undergraduate students have worked and/or trained at ASTA's three applied research centers.

for NASA and other aerospace programs. Seven institutions are participating in the consortium: Arkansas State University; Harding University; University of Arkansas, Fayetteville; University of Arkansas at Little Rock, University of Arkansas for Medical Sciences, University of Arkansas at Pine Bluff, and the University of Central Arkansas. Representatives from each of these colleges and universities make up a planning committee to oversee the distribution of funding.

NASA awarded ASGC a Capability Enhancement Grant in 1991, of which two-thirds went to Faculty Capability Enhancement Grants and the remaining third to Student Fellowships. The grant was matched by \$75,000 from the Arkansas Science & Technology Authority (ASTA), enabling 17 faculty grants and 15 student fellowships to be awarded.

EPSCoR. The Experimental Program to Stimulate Competitive Research was initiated by the NSF in 1979 to develop nationally competitive scientific research in participating states. The EPSCoR program is managed by a committee of scientists and engineers representing universities and colleges in the state, plus governmental and industrial representatives. The Arkansas EPSCoR Committee has been successful in FY1992 in competing for grants from federal agencies that have EPSCoR programs.

Planning grants were awarded to the Arkansas EPSCoR Com-

mittee from the Department of Energy (DOE) for \$100,000 in September 1991 and from the Environmental Protection Agency (EPA) for \$50,000 in October 1991.

NSF requested that the Committee submit an amendment to the Advanced Development Program Proposal (Phase III) in December 1991. First year monies of \$1,000,000 per year for three years were awarded to the Committee in March 1992. The award is for projects at the three applied research centers, the development of an outreach program by the EPSCoR Committee, and administrative support for the Committee.

The award is dependent on a one-to-one cash match from the state. Matching funds for the grant was appropriated in the Capital Improvement funds for ASTA. Governor Bill Clinton notified the President of ASTA in May that monies were not available for the match. It is expected that the respective campuses of the centers have or will be furnishing the dollar-for-dollar match for their projects for the first year.

The projects are at the Arkansas Neurology Research Center located at the University of Arkansas for Medical Sciences, the Center for Cellular and Molecular Studies on Biological Aging located at the Veterans Administration Medical Center and affiliated with the University of Arkansas for Medical Sciences, and the Center for Protein Dynamics located at the University of Arkansas, Fayetteville.

Development

Development supports an array of projects and programs that provide the pathway for development of innovative ideas into products, small businesses, and ultimately, well-paying technology-based employment for the citizens of Arkansas.

The Seed Capital Investment

Program. Investments are made in scientific and technological projects of Arkansas-based, start-up and existing companies. This is the capstone program of the Arkansas Science & Technology Authority (ASTA); ideally, such companies are launched and jobs are created as a result of research and development projects that are funded under other ASTA programs.

Several ASTA seed capital investments matured and paid out in FY1992. ARTECH in Clarksville expanded its operation into North Carolina. TSI Redfield's corporate parent successfully converted warrants to equity and restructured debt to take advantage of falling interest rates. Law Office Information Systems completed the conversion of case law in five states to its distinctive computer indexing system.

In addition, the program staff reviewed six potential seed capital applicants and assisted over 90 additional inquiries concerning financing and business development.

Table 4 shows the Seed Capital Investment Fund for FY1992.

The Technology Transfer

Program. This program began in 1985 to establish a link between the technological resources of the state's universities and private businesses. The primary goal of this service program has been to help Arkansas business and industry become better prepared for competition in a technology-driven economy.

The Technology Transfer Program has traditionally functioned through referrals to specific technology development programs at ASTA and to college and university resources. The general strategy has been to facilitate cooperation between public and private entities and to foster early-stage development projects. The Technology Extension Pilot Project and the Technology Extension Planning Project, funded in partnership with the National Institute of Standards and Technology (NIST), have provided the framework for the potential expansion of the Technology Transfer Program.

Since inception, the Seed Capital Investment Program has invested over \$1.25M, leveraging an additional \$5.48M from other sources, in start-up businesses. These businesses have created more than 215 new jobs in Arkansas.

The Technology Transfer Program has established a link between the technological resources of the state's universities and federal labs and private business for the increasing competition of a technology-driven economy.

Table 4

Seed Capital Investment Fund, FY 1992

Beginning balance, money market accounts	\$252,379.13
Interest earned and principal repaid	
Interest, money market accounts	\$14,186.81
Interest, CD account	86,279.35
Interest, Seed Capital accounts	17,559.73
Principal, Seed Capital accounts	467,439.10
Total principal repaid and interest earned	585,464.99
Fund expenses less FY1992 investments	< 500,000.00 >
Ending balance, money market accounts	337,844.12
Investments receivable	233,609.11
Certificates of deposit	2,000,000.00
Total Seed Capital Investment Funds balance	\$2,571,453.23

The \$125,000 Technology Extension Pilot Project provided 33 mini grants to assist small- and medium-sized businesses identify and solve their technical problems.

The Technology Development Program. Approved in 1989, this was not funded until 1991. The program's purpose is to support development and commercialization of innovative technology.

In July 1991, ASTA received a \$250,000 grant from the Energy Office of the Arkansas Industrial Development Commission (AIDC- Petroleum Violation Escrow Fund) to provide funds for energy-related technology development.

The program is intended to provide "bridge" financing between other programs of ASTA. New business opportunities, with related employment and economic growth potential, should result from this program and feed into other state-supported business assistance programs.

In the Technology Development Program, the Energy-Related Technology Development Project invests monies in energy-related projects that provide the benefits of science and advanced technology to the people of Arkansas. Awards made will be considered investments with terms negotiated on a case-by-case basis, with a maximum 5% royalty on net sales for a maximum of 10 years. The maximum award will be \$50,000.

Technology Extension Pilot Project. In June 1990, ASTA submitted a Federal Technology Extension Pilot Project proposal to NIST. The proposal sought to establish a statewide initiative for small businesses, linking together a network of existing business assistance service providers and technical assistance service providers. In September 1990, the proposal was selected as one of nine states and ASTA received a \$125,000 grant from NIST.

By the conclusion of the grant period in September 1991, thirty-three specific projects, involving 32 Arkansas businesses in 20 counties, were authorized under the aegis of this pilot project. The network assisted these businesses in soliciting, evaluating, and implementing specific federal technology transfer projects, which were supported by ASTA with NIST funding.

The three technology assistance service providers in the network were (1) Arkansas Center for Technology Transfer, University of Arkansas, Fayetteville; (2) College of Science and Engineering Technology, University of Arkansas at Little Rock; and (3) Center for Competitive Manufacturing, Southern Arkansas University- Technical Branch at Camden.

The two most important findings derived from this project are (1) the need for technical assistance exists and (2) there are state resources that are capable of providing quality technical assistance. The long-term implication

of lessons learned in the pilot project is that federal laboratory resources and business needs can be brought together, but require intermediaries who are familiar with local companies and who can use alternative sources of information when there is no ready match with federal labs. Detailed information on the pilot project is available from ASTA in the format of a final report to NIST entitled "Technology Extension Pilot Project".

Technology Extension Planning Project. In September 1991, ASTA was awarded a \$23,250 grant from NIST for a project entitled "State-Wide Technology Extension Program Planning Proposal of the Arkansas Science & Technology Authority." ASTA was one of only two states to be awarded both NIST grants.

The goals for the Technology Extension Planning Project are in the format that addresses the following:

- Regional need, including a market analysis and geographical location of industrial sectors;
- Technology resources;
- Technology delivery mechanisms, including linkages to third parties and program leverage; and
- Management and financial plan, including organizational structure, program management, internal evaluation, plans for financial matching, and budget.

The Business Incubator Program. Established in 1985, this program fosters, in cooperation with colleges and universities, the development of technology-based businesses. Four of the seven incubators that received initial funding from ASTA currently serve the needs of technology-based businesses throughout the state. These four are:

GENESIS: A science and technology economic development project at the University of Arkansas, Fayetteville;

The East Arkansas Business Incubator System (EABIS) at Arkansas State University in Jonesboro;

The Industrial Renaissance Center at the University of Arkansas at Monticello; and

The Institute for Innovative Business Development at the University of Arkansas at Pine Bluff.

In May 1992, the National Business Incubator Association (NBIA) and Coopers & Lybrand honored GENESIS as the 1992 Business Incubator of the Year at the NBIA Annual Conference in Austin, Texas. Sam Pruett, Director of the GENESIS Project, accepted the award.

According to an NBIA award announcement, the 40,000 square foot incubator has helped to create 25 companies, which now employ more than 300 people. Furthermore, GENESIS graduates have generated more than 200 jobs and \$24.3 million in total revenues. The total aggregated

revenues of tenant firms in its most recent fiscal year was \$5.1 million, and the tenants paid more than \$238,000 in state and local taxes.

SBIR. Two companies in the state continue to be noticeably successful in competing for federal Small Business Innovation Research (SBIR) grants. Engineering Resources, Inc. and InvoTek, both of Fayetteville, have again been awarded SBIR grants this fiscal year.

Engineering Resources received a Phase II grant in the amount of \$500,000 from the Department of Energy (DOE). The project involves producing highly flammable chemicals from coal through the introduction of a microorganism. The work could lead to the development of a synthetic fuel that would allow cars to run cleaner.

InvoTek has been awarded two Phase I grants, \$50,000 each, from the National Institutes of Health. The first project is the development of an "attended-control patient transfer device", a small robot that helps nurses lift patients as tall as 6.5 feet and as heavy as 300 pounds. The second project involves the design and testing of a device that gives continuous feedback to children who have extremely short attention spans or attention deficit disorder.

The SBIR program is an excellent source of research and development funds for innovative companies. ASTA's SBIR awareness program can assist businesses in pursuing these federal funds.

The four business incubators' success centers on each creating an environment to stimulate technological innovation, and each fostering the growth of technology-based enterprises.

An awareness program, Small Business Innovation Research assists small businesses in developing research ideas for eventual commercialization by identifying opportunities for federal grants.

Special Projects

Special projects are the result of ASTA taking the lead in developing, implementing, and providing support for specific action agendas that enhance its basic mission.

Arkansas Industrial Network

Project. At the request of Governor Clinton, the Arkansas Science & Technology Authority (ASTA) has been involved as the lead agency in the Arkansas Industrial Networking Project, which is supported by a grant from the Rockefeller Foundation to the Southern Technology Council. The project has involved training Network Brokers to help small businesses establish industrial networks around the state and to provide challenge grants as incentives for network projects.

Funds have been raised from non-ASTA sources to fund network challenge grants, six of which have been awarded by a cooperating group including ASTA, the Southern Technology Council, and Winrock International.

The six challenge grants are: (1) The Arkansas Enterprise Group (\$20,000) for the Southern Wood Products Association to network 20 companies to develop business strategies and provide management services; (2) Westark Community College (\$10,000) for the Ft. Smith Manufacturing

Project to identify furniture/fixture companies, develop a capabilities directory, and identify common problems and opportunities; (3) Arkansas State University, Beebe (\$15,000) for a network of three metalworking firms to purchase and share the capacity of a CAD/CAM system; (4) Phillips County Community College (\$10,000) for the Delta Safety Network to provide required Department of Labor (DOL) safety training to 12 companies; (5) the Metalworking Connection (\$20,000) for a buyer-seller just-in-time inventory system for 57 companies; and (6) the Woodworkers Manufacturing Cooperative (\$14,900) for development of a low cost, numerically-controlled router for five companies.

Ventures in Education Project.

In September 1991, the National Science Foundation (NSF) provided a supplement to its Arkansas Experimental Program to Stimulate Competitive Research (EPSCoR) funding for the planning and development of a "Ventures In Education" Project in Arkansas. The goals of the Ventures program are:

- To increase academic achievement, especially in mathematics and science, among low-income and minority high school students;
- To increase the rate of college admissions and attendance among this student population;
- To fully prepare these students to pursue post-secondary study leading to careers in scientific fields; and

- To build the ongoing capacity of local schools to deliver academic quality by increasing the skill levels of high school teachers through high quality professional development activities.

As a result of a three-month recruitment process, 8 rural school districts in the Arkansas Delta Region (including Brinkley, Cross County, Lee County, Stuttgart, Dumas, Earl, Turrell and Lakeside) elected to participate in an intensive planning process leading to implementation of the Ventures model beginning with the 1992-93 school year.

Planning teams from each school district attended a two-day training seminar in late January 1992. Using a common planning process, each planning team designed a Ventures program to reflect the needs and resources of their local high school and community.

Each planning team designed a 1992 summer orientation program for entering ninth graders and a Ventures model program of enhanced curriculum for the ninth grade to begin in the fall of 1992.

Throughout the 1992-93 school year, the planning teams will continue their work to "fine tune" the ninth grade implementation, to develop the tenth grade design for the 1993-94 school year, and to review the summer orientation program design for 1993. The overall plan calls for the introduction of the Ventures model in a higher grade each year with the first full Ventures high school classes graduating at the end of the fourth year.

Comparative Financial Statements

State revenue and expenditures for fiscal years ending June 30, 1991 and 1992

Revenue	FY1991	FY1992
Revenue appropriation	\$ 1,050,578.00	\$ 1,497,579.00
Deferments	0.00	<365,816.00>
Net revenue allocation	\$ 1,050,578.00	\$ 1,131,763.00
Expenditures:		
Salaries	\$ 325,623.67	\$ 311,574.53
Employee benefits	68,754.15	67,203.85
Postage & delivery	4,376.25	3,778.10
Telephone & telex	1,698.01	63.30
Printing & duplicating	6,899.19	5,372.03
Office equipment maintenance	2,135.74	1,483.43
Office & equipment rent	44,895.21	46,705.10
Travel & sponsored meetings	15,717.41	14,117.79
Association dues & membership	12,079.00	10,841.00
Professional fees	4,668.76	9,205.19
Centrex phone services	10,099.23	6,909.57
Conference & convention fees	16,494.66	14,126.66
Insurance premiums	363.00	356.00
Stationary & office supplies	5,962.98	4,048.48
Subscriptions & publications	4,247.74	2,065.77
Software purchases	2,015.84	5,112.51
Equipment	11,251.02	2,825.82
Contract labor		3,033.12
Total operating expenditures	\$ 537,281.86	\$ 508,822.25
Research grants/incubators	\$ 361,445.12	\$ 575,782.00
Project match	\$ 139,046.88	
Total expenditures	\$ 1,037,773.86	\$ 1,084,604.25
Net revenue allocation	\$ 1,050,578.00	\$ 1,131,763.00
Less total expenditures	<\$1,037,773.86>	<\$1,084,604.25>
Unspent allocation	\$ 12,804.14	\$ 47,158.75*

*\$44,373 carry forward to FY93 for Basic & Applied Research Grants

Year at a Glance

July 1991

John Ahlen served on the Advisory Board for the Arkansas School for Mathematics and Science for the entire fiscal year. ASTA Board of Directors Meeting held July 26.

Jim Benham gave a speech on the Arkansas Industrial Networking Challenge Project Grant Program to the regional Southern Technology Council in Nashville, Tennessee.

Jim Benham attended a meeting at the National Institute of Standards and Technology in Gaithersburg, Maryland to present the Technology Extension Pilot Project. While there, Jim gave an update on the Arkansas Experience with Industrial Networks Project to the National Governors' Assn.

August 1991

Jim Benham attended the Economic Development Institute in Norman, Oklahoma.

September 1991

ASTA Vice Presidents and Program Managers attended a Staff Planning Retreat to develop the strategic plan for this year.

ASTA Staff hosted a Media Workshop to obtain a better understanding of media relations. Local media figures who presented information and answered questions include: Pat Lynch, KARN/ARN; Doug Kryle, KARK Channel 4; Andy Moreau, Arkansas Democrat; and, Carol Griffie, Editorial Services, Inc.

October 1991

ASTA Vice Presidents and Program Managers attended the second Staff Planning Retreat to iron out final strategic plans for the year's programs and events.

Susan Collins attended the National Ventures in Education Faculty Development Conference in Long Island, New York.

November 1991

ASTA Board of Directors Planning Meeting held Nov. 15, when the staff presented the strategic plan for the Board's approval.

ASTA Staff toured the National Center for Toxicology Research in Pine Bluff.

January 1992

ASTA Board of Directors Meeting held January 17.

Susan Collins held the Ventures in Education Orientation Conference in Little Rock for participating Arkansas schools.

February 1992

John Ahlen attended the Southern Technology Council meeting in Little Rock.

Jim Benham held a meeting at ASTA for network brokers in Arkansas to meet with the Southern Technology Council to discuss what is working for them.

Jim Benham attended the Industrial Modernization Academy in New Orleans, sponsored by the Southern Technology Council through grants awarded to them. Representatives from a four-state region learned about

several countries' efforts to modernize the industrial sector through competitiveness. Ventures in Education Planning Series began.

March 1992

John Ahlen attended the Arkansas Capital Corporation Annual Meeting in Little Rock. ASTA Board of Directors Meeting held March 27.

Jim Benham attended the Southern Technology Council Regional Networking meeting in Chapel Hill, North Carolina.

April 1992

Ventures in Education Planning Series is completed.

May 1992

ASTA Board of Directors Meeting held May 15.

June 1992

Chuck Myers presented a paper entitled "The Federal Technology Extension Pilot Project of the Arkansas Science & Technology Authority" at the 1992 Technology Transfer Society Annual Conference in Atlanta.

Chuck Myers completed the Arkansas Certified Public Managers Program and was awarded designation as an Arkansas Governmental Manager.

Ventures in Education Summer Programs began in participating Arkansas schools.